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Plan now to attend the Annual Conference of the Southwestern Medical Association, October 18-20 in El Paso

Sept. 1951

Public Relations Program Suggestions for the New Mexico Medical Society.....Page 299
By Evan A. Edwards, Public Relations Director, Colorado State Medical Society

False Prosperity .....Page 301
By Robert B. Homan, Jr., M. D., El Paso

The Treatment of Diabetes Mellitus Today.....Page 302
By Ralph G. Greenlee, M. D., Temple, Texas

Variability of Insulin Response.....Page 308
By Theodore M. Feinblatt, M. D., and Edgar A. Ferguson, Jr., Chemist, Brooklyn, N. Y.

Oil Soluble Caudal Anaesthesia for Ano-Rectal Surgery .....Page 310
By Harold Eidinoff, M. D., El Paso

REMEMBER THIS TERM?

hirud.

Very likely you would if you had practiced in 1876, when lantern parades and street fights were popular forms of entertainment—and Eli Lilly and Company had just begun.

Then the prescription for a *hirudo*, or leech, was the preferred treatment for a "black eye." In contrast, studies today are bent upon conquering the more serious vascular disorders. Research of this kind has made real progress in the Lilly Laboratories.

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One of the major criticisms voiced in most communities is that doctors seem always too busy to take part in local affairs. They decline to serve on school boards, or on city councils, or to work in PTA, or to be active in the various health and charity campaigns. It is also a cause of concern to lay leaders that physicians generally do not show an interest in politics and will not run for local or state offices.

COMPLAINTS

Another criticism is that physicians cannot be reached when needed. There is complaint about failure to answer night calls. A third involves failure of some doctors to fully explain *total* costs of medical care. While doctor's fees have increased only slightly in recent years, hospital and medicine and drug charges have gone up sharply. When a man visits a doctor's office and is given a prescription for $18.50 worth of aureomycin, he should be told *why* it is prescribed, what it will cost, and how the $18.50 will probably obviate the need for a $100.00 stay in the hospital. Otherwise, when the patient pays the druggist he's apt to say a few unkind words, under his breath, about the M. D.

These generalized remarks are intended to point up the reasons for good medical public relations programs and some of the things that can be done in the primary task of public education.

SOME POINTS TO CONSIDER

The New Mexico Medical Society is small in numbers but possessing of excellent leadership. It has had an executive secretary, and a very good one, for about two years. It has raised its dues twice in that period. It has a peculiar and difficult problem with respect to the osteopaths, of whom there are some 150 in the state. There are also about 150 MD's in the state who do not belong to the medical society.

There is a big job to be done. It would appear that the first step might be a well-defined program of education within the profession. It is therefore the opinion of the writer that it would be better at this time to inaugurate a 10 or 12-point program for county societies than to engage a state public relations director. It is conceivable that the total New Mexico membership is not sufficiently informed and interested, at this time, to lend maximum support to a state-level public relations program. Further, the additional expense would require another increase in dues which might deter non-members from seeking membership.

It is therefore recommended that consideration be given to preparing a grass-roots program of public relations and community service for action by county groups. This would serve to activate the profession and to educate the membership as to the many possibilities in these fields.

Conduct of a program of this sort for the remainder of the Society's year would bring the membership to the next annual session with a much better understanding of what can be done in view of obvious limitations of memberships and budget.

Here are some suggestions for a state program.

1. A continuation of visits by state officers to county societies, with emphasis on the public relations program as approved.
2. An intensified effort to increase the membership.
3. Broader liaison with farm and ranch groups, women's clubs, the PTA, State Chamber of Commerce, members of the legislature, the Hospital Board and other professional groups such as lawyers, dentists and nurses. (Note: Each PTA unit has a health chairman).
4. More publicity in the daily press and the farm and ranch publications about worthwhile activities of the State Society.
5. Encourage physicians to make regular office distribution of interesting, informative reprints available through the AMA, such as Paul de Kruif's recent Readers' Digest article, "Your Doctor for a Friend."
6. Inauguration of a "Dear Joe" letter by the State President to the President of each county society (copy to Secretary) similar to Colorado's. A letter of this sort makes for unity and lends itself to content not always advisable for a general circulation newsletter.
7. Preparation and distribution of an educational pamphlet along the lines of my suggestion to Leo Brown on "Modern Medical Care and Your Health." A pamphlet of this kind would probably have broad acceptance in the schools, not to mention wide lay use. If AMA cannot prepare this, believe New Mexico Medical Society should.

(Continued on Page 311)

De Rebus Medicis Et Politicis

BY ROBERT B. HOMAN, JR., M. D., EL PASO, TEXAS
MEMBER OF THE HOUSE OF DELEGATES OF THE AMERICAN MEDICAL ASSOCIATION

FALSE PROSPERITY

The writer would be the last to be labelled an economist. Nevertheless, the recent report on the Survey of Physicians' Incomes for 1949 seems to call for a dissertation on economics. This survey was carried out by the U. S. Department of Commerce, with the co-operation of the A. M. A. Bureau of Medical Economic Research. Every physician should read Dr. Dickinson's review of this survey in the Journal of the A. M. A. (July 28th, P. 1249).

For a great many years the social planners have been stirring up the American people against the doctors, their income, their organizations, and their human shortcomings. Exaggeration of the earnings of doctors has been part of the program to produce class strife and hatred in these United States. Charges of monopolism have been hurled at the medical associations in a further effort to discredit doctors. These things are no accidents; they are the fine work of enemies of the American system of free enterprise. If they can convince enough people that the doctors are robbers and monopolists — causing medical care to cost too much — these American people will fall into the trap of socialism in medical care.

When the newspapers reported that the results of the survey of private physicians' incomes revealed that the average net income for the year 1949 was $11,058.00, the articles expressed surprise that this figure was lower than was "generally expected". Generally expected by whom? By the people who have swallowed the propaganda line of the socialists and their co-conspirators — chiefly the bureaucrats.

In 1929 the mean net income of all civilian physicians was $5,304.00 — that income in 1949 was $11,058.00, an increase of 108 per cent in 20 years. The increase for all earners in the general population was 109 per cent in the same 20 years. Thus, percentage-wise the physician's income has increased parallel to the increase of income for all employed people. This increase is something to be expected in the greatest inflationary period in our history — and there, of course, is the rub.

Inflation causes devaluation of the currency; lower purchasing power per dollar; higher prices, higher wages, higher rents, and higher taxation. In 1929 the dollar was worth a dollar — in 1949 its purchasing power was roughly 50 per cent of its value 20 years before. This increase of 108 per cent in earnings is entirely false on the face of it.

There are other factors which are interesting in this connection. The most important of these is the income tax, which has become the levelling tool of the bureaucratic government which believes that government can spend itself into prosperity. By the time the Bureau of Internal Revenue gets through with the average doctor's "net", he ends up a debtor to the loan company! He certainly has not the purchasing power left that he had in 1929, when the schedule was reasonable. The same is true, of course, in this respect, of the laborer, the wage-earner, the other professions and white-collar workers. They had more value in their take home pay in 1929 than they had in 1949.

Also of interest are the figures of the Consumer's Price Index (U. S. Bureau of Labor Statistics). Using the base period 1934-1939 as normal, this price index was 69 per cent above the base in 1949. (79 per cent today). Part of this index are physician's fees. These were reportedly 38 per cent above the 1934-39 base. Thus the increase in total income of 108 per cent per physician *was not* caused by an increase of 38 per cent in the physician's fees. With more money in circulation, perhaps the physician's collections are better. More likely, however, the increased income is due to "greater out-put per physician", better standards of medical care, the wonder-drugs, and in many cases longer hours of work. It should be pointed out in this connection that the 40 hour work-week, over-time pay increases, and other laws designed to protect the worker from exploitation and give him more leisure time, have come into existence during the period in question. The doctor has the same 24 hour day — part of which he gives away in service to the medically needy.

Another item which the American people, the doctors' patients, do not realize is that approximately two-fifths of a doctor's gross income is eaten up by operating expenses,

(Continued on Page 307)

THE TREATMENT OF DIABETES MELLITUS TODAY*

By Ralph G. Greenlee, M. D., Temple, Texas**

INTRODUCTION

This communication will review methods for the treatment of diabetes mellitus which are available to the physician at the present time. Emphasis will be placed upon certain principles of management which, although not new, are often disregarded, and criteria for control of the disease will be outlined. In addition, an attempt will be made to reveal from the wealth of recent advances in our knowledge of carbohydrate metabolism as many new approaches to the clinical problem as possible. No effort will be made to consider the complications of diabetes. Diabetic acidosis, although it can be considered as the direct result of uncontrolled diabetes and not a complication, is a subject for separate discussion.

Since the introduction of insulin, there has been little change in the fundamental methods of therapy in diabetes. As during the past twenty years, diet, insulin, exercise, and education of the patient are still the mainstays of treatment. Many advances have taken place, however, in the technics of applying these principles. This has been particularly true in the use of insulin and in the types of insulin available. Let us consider, then, these principles of therapy, and, in doing so, search ourselves a little to be sure that we are offering our diabetic patients all of the treatment that is due them.

PRINCIPLES OF DIABETIC MANAGEMENT

Diet. — In spite of the fact that it has been almost 30 years since the introduction of insulin into the therapy of diabetes, it has been only recently that the "principle of starvation," the mainstay of diet therapy in the pre-insulin era, has been discarded in arranging diets for non-obese diabetic patients. It may be said that the diet of the diabetic should differ but little from that of the non-diabetic. However, in order to maintain any degree of control of glycosuria and hyperglycemia, it must be of constant caloric content. As a rule, the total daily caloric content of the diet is calculated on the basis of the so-called "average weight" for age, sex, and height, compiled about 50 years ago by the insurance companies. These tables do not take into account the body build of the patient. More recently, "ideal weights," based upon the body weight at age 25 of persons who attained maximum longevity, have been compiled by the Metropolitan Life Insurance Company. These tables do take into consideration body build, and are being utilized more and more by physicians concerned with the treatment of diabetes. Whether one estimates the daily caloric requirement by the use of nomograms, as Wilder[1] recommends, or uses 25 to 35 calories per kilogram of body weight, as Joslin,[2] Barach,[3] and Mosenthal,[4] as well as others prefer; one must keep in mind that the caloric content of the diet should in the last analysis be sufficient to maintain or effect the patient's desired weight, maintain his strength, and avoid obesity. For children and individuals performing manual labor, a higher caloric requirement, 60 to 100 calories per kilogram, is necessary. Joslin recommends 1000 calories for age one year, and 100 calories added for each year of age up to 13 years for girls and 19 years for boys.

COMPUTING DIETS

In computing diabetic diets, adequate amounts of proteins, carbohydrates and fats, along with vitamins and minerals, must be supplied as in diets of non-diabetics. The tendency is to prescribe diets of higher protein content, averaging one to two grams per kilogram of body weight per day. Schneider, Lewis, and McCullagh[5] found that a high protein diet may be useful in the management of retinopathy, and used diets containing 120 to 140 grams per day. Most diabetic diets still exhibit some restriction of carbohydrate, 150 to 160 grams daily for the average office worker or housewife. In the diets of children and manual laborers, values of 200 to 300 grams are indicated to increase caloric intake. Protein and carbohydrate foods are, of course, the principle source of vitamins and minerals in the diet. The fat content of the diet, unless weight reduction is indicated, will of necessity be in the neighborhood of 70 to 100 grams per day, since quantities less than this make for an unpalatable fare. Fat is used principally to complete the caloric requirement in most prescriptions. Some evidence has been advanced that low fat diets are less diabetogenic.[6] In

*From the Department of Medicine of the Scott and White Clinic.

**Read before a regular meeting of the Kimble, Menard, Mason, and McCulloch Counties Medical Society, Mason, Texas on September 6, 1950.

patients showing hypercholesterolemia and those with demonstrable arteriosclerosis, the fat content of the diet should be kept to a minimum.

In formulating a diet, care must be taken to include the basic amounts of food necessary for adequate accessory food factors and minerals. The Council on Foods of the American Medical Association recommends that the diet of an adult should contain at least one pint of milk, two servings of vegetables, two servings of fruit, one or two servings of protein foods, and a serving of whole grain cereal. These principles should be kept in mind.

INSULIN

Whether or not a newly diagnosed case of diabetes will need insulin to effect control of hyperglycemia and glycosuria depends on many factors. Over the country as a whole it is apparent that about one-half of all diabetics require exogenous insulin for adequate control. Many physicians, among them Colwell,[7] recommend placing the new patient on a basic diet and observing the effect on blood and urine sugar for a few days. If glycosuria persists, insulin therapy is then instituted. Others place the patient on a final type diet and begin insulin at once. In general, one can expect the juvenile and the young, slender individual to need insulin indefinitely. The obese, middle-aged diabetic can be expected to become controlled by dietary restriction and weight loss, although insulin therapy may be needed for awhile. Because few patients have the time or money to spend for a lengthy trial of diet alone to control their symptoms, a policy of using insulin in all except the mildest cases can be recommended, tapering the dosage as the patient's condition improves.

Today the physician has three types of commercially available insulins to use: a short-acting insulin (regular or crystalline); intermediate-acting insulin (globin insulin with zinc, or mixtures of protamine and regular insulin); and a long acting insulin (protamine zinc insulin). Knowledge of respective actions is indispensible to the practitioner engaged in treating diabetes.

Regular insulin when injected subcutaneously begins acting within one hour after injection and reaches a peak of action within 3-6 hours. It is the insulin of choice in emergencies to supplement the action of the depot insulins, and to treat the diabetic who has undergone a surgical operation. Its drawback is that it must be injected at least two to four times daily to control the diabetic of moderate or severe degree.

DEPOT INSULIN

Protamine zinc insulin was developed as a depot insulin for patients requiring multiple doses of regular insulin. It is usually injected subcutaneously before breakfast. Its action begins four to eight hours after injection, reaches a peak in 24 to 32 hours, and may last for as long as three days. Its action therefore overlaps from day to day, the general effect being to lower the level of blood sugar constantly. Because of this continuous action, large doses of protamine (over 30 units) are almost invariably followed by hypoglycemia during the early morning hours. It has been shown that this is not due to greater intensity of action, but rather to the fact that no food has been taken for several hours. Hence, whether the patient takes protamine insulin in the morning or at bedtime, reactions still occur during the early morning hours. At the present time the use of protamine zinc insulin alone should be confined to the diabetic of no more than moderate severity.[7]

Because of the short-comings of protamine, efforts were made to find an insulin of intermediate action between it and regular insulin. Globin insulin with zinc and mixtures of at least two parts of regular insulin to one part of protamine zinc insulin have been found more successful in controlling the post-cibal rises in blood sugar in severe diabetics without subjecting them to the dangers of severe insulin reactions during the night. Commercial protamine zinc insulin contains an excess of protamine so that when regular insulin is mixed with it either in the same syringe or in a separate container, a portion of the regular insulin is absorbed by the protamine and an insulin of intermediate action results. The most commonly prescribed "2 to 1" mixture has about the same time action curve as globin insulin with zinc. Insulin mixtures possess the advantage, however, that they can be "tailor made" to suit the individual case. Many patients who tend to show excessive post-prandial glycosuria need greater proportions of short-acting insulin. Thus, 2.5 to one and three to one mixtures may be used. Mixtures containing equal parts of protamine and regular insulin tend to have the same characteristics as unmodified protamine zinc insulin and should not be used. In adjusting the dosage of insulin mixtures, one may use the before breakfast specimen of urine and the fasting blood sugar to gauge the amount of long-acting insulin necessary. The before supper specimen can be used to adjust the dosage of the short-acting component. Reactions to both types of

intermediate acting insulin tend to occur in the afternoon. Their action begins 2 to 4 hours after injection, reaching a peak in 8 to 16 hours with an effect, in large dosages, lasting up to two days. Time-action curves of these insulins have been thoroughly studied by Colwell and his associates.[7,8]

EXPERIMENTAL STAGE

In the experimental stage are two types of insulin with intermediate action. One, developed in the Lilly Research Laboratories and known as NPH-50, has been recently made available. It has essentially the same action as a two-one mixture. Regular insulin may be added to it without producing further modification. Another, developed by MacBryde and Roberts, also contains less protamine than regular insulin, but is buffered in such a way that about one-fourth of its insulin content remains in solution and three-fourths is suspended. Its action is again about the same as that of a two-one mixture. Rohr and Colwell[9] and others[10b] have recently reported the use of mixtures of regular and globin insulin, again with the aim of providing an intermediate-acting insulin having its strongest action during periods of the day when food is taken.

Intermediate acting insulin is of greatest value in the treatment of the severe diabetic. As a rule it is given in one injection before breakfast, but, on occasion, may be administered also before the evening meal when difficulty in controlling the night specimens is encountered. Under these circumstances, two-thirds of the daily dosage is administered before breakfast and one-third is given before the evening meal.

With all intermediate and long-acting insulins, feedings in mid-afternoon and at bedtime are important insurance against insulin reactions.

EXERCISE

Exercise is one of the neglected principles of diabetic care. For many years it has been known that, as long as insulin is acting, whether it be endogenous or exogenous, muscular exercise exerts a hypoglycemic effect. In Juvenile diabetics this can be used to advantage especially in keeping the number of injections to a minimum as well as controlling the total dosage. Exercise, however, may be harmful to the diabetic who is receiving insufficient doses of insulin. In this connection, mention of camps for diabetic children should be made. A diabetic camp will provide the well-supervised outdoor exercise often denied the child suffering from diabetes.

EDUCATION

The principle of education is probably the most neglected aspect of treatment in many cases of diabetes. Many patients are rendered utterly dependent upon overly frequent visits to the physician, and are subjected to preventable hospital expense because this feature of their treatment was not undertaken in sufficient detail. It has been said that every diabetic should be his own physician and should use his doctor as a consultant.

From experience, it is desirable that every new case of diabetes be hospitalized initially simply to provide the opportunity for instructing the patient in the general aspects of the disease; the prevention of complications; the use of insulin, if necessary; and in dietetics. Hospitalization, moreover, makes use of an important therapeutic tool, that of group psychotherapy. In the hospital, the new diabetic patient may come in contact with others suffering from the same disease. Emotional adjustment to a chronic disease is not easy, and a period of time in the hospital may make the difference between success or failure in obtaining the patient's confidence and cooperation in following the physician's advice. Education of the patient requires a team of physician, dietician, nursing and resident staff, and very often the chiropedist, and ophthalmologist. The teaching of a weighed diet is recommended since it enhances the patient's ability to make substitutions and vary his diet to avoid monotony. Measured diets of equal caloric content may then be prescribed when the patient is dismissed.

STANDARDIZATION

A certain amount of standardization of the technics of treatment should be taught the diabetic patient. Insulin syringes which have been approved by the American Diabetes Association should be mentioned. These may be of the long or short type and are graduated in units. For patients requiring less than 40 units, a single scale in red numbers for use with U40 concentrations of insulin is employed. Similarly, for patients requiring more than 40 units of insulin daily, a single scale in green numbers for use with U80 insulin only is provided. For the occasional patient who requires more than 80 units daily a 2 cubic centimeter syringe graduated in green numbers to 120 units is available. The importance of these syringes to the patient cannot be overly emphasized. Many patients are confused about their insulin dosage when syringes graduated in cubic centimeters are used. Other syringes avail-

able to them have both U40 and U80 scales inscribed, making the chance of an error in dosage a constant hazard.

In juvenile diabetics it is mandatory that the parents of the child be included in the educational program. Many a diabetic child has been made uncooperative merely because of the parents' attitudes toward the disease. As early as possible in the treatment of the diabetic child, the physician should carefully explain to the parents their responsibility in this matter. The patient, if physically able, should be taught to make his own insulin injections and should be encouraged to look upon this feature of his treatment in the same light that he regards such daily personal chores as brushing his teeth or combing his hair. Beaser[10] in a recent review of progress in diabetes cites the work of Bruch who found that the success of physiologic control of the child diabetic was shown to be related to the "psychological climate of the home."

EMOTIONAL UPSETS

That emotional upsets may disturb the level of ketone production and cause fluctuations in blood sugar levels has been shown by Wolf and his associates.[11] A case in point is that of a young man who, anxious to attend an insurance convention where he was to be awarded a prize for his work as a salesman, reported to the clinic for observation, but was afraid that he might have to remain for adjustment in his insulin dosage and miss the convention. Upon investigation, his blood sugar was found to be 400 mg. per cent, although as a rule it had been near 200 mg. per cent. Because of the fact that he showed no glycosuria and was evidently not ill in any way, the patient was re-assured, attended the convention, and received his award. Without alteration in his insulin dosage or diet, he returned for observation some time later and at that time, relaxed and content, his blood sugar was again at 200 mg. per cent. This patient fell into the class of the so-called "brittle diabetic" who is subject to marked swings from hyper to hypoglycemia. Many times severe episodes of ketosis and hyperglycemia cannot be explained on the basis of intercurrent infection or deviations from the prescribed diet or failure to take insulin. In many of these cases emotional disturbances are probably at fault. Wolf[11] postulates that these changes in blood chemistry are probably mediated through the pituitary-adrenal responses to stress.

From this it can be adduced that psychological adjustment to the disease is of the utmost importance in good control. The patient should be made aware of these factors and bend his efforts toward avoiding or toward being prepared for the consequences of emotional storms, just as he should know that his insulin requirement may rise in the presence of intercurrent infection.

CRITERIA FOR THE CONTROL OF DIABETES MELLITUS

What should be the criteria for control which the physician sets for himself and his patient? In few diseases exists such a wide divergence of opinion as to what constitutes control as there is in diabetes mellitus. This is largely due to the fact that the exact cause or causes of the diabetic syndrome are not known, except in the unusual instances of overt pituitary, thyroid, adrenal, hepatic, and pancreatic disease. Unfortunately, during recent years, a fatalistic attitude as to the inevitability of complications in diabetes has been introduced by the work of Tolstoi. His group has emphasized that diabetic patients can live in apparent good health by partial control of hyperglycemia and glycosuria, taking an unrestricted diet and some protamine zinc insulin. The burden of proof as to the long-term efficacy of this type of management is on the proponents of these precepts. It does seem fairly well established, however, that arteriosclerosis, retinopathy, and renal disease are probably a part of or the direct result of the syndrome of diabetes mellitus and are related more to the duration of the disease than to the degree of control of abnormal carbohydrate metabolism. That these sequels can be delayed by strict adherence to the principles of control of abnormal blood chemistry is suggested by the work of Joslin's group as well as recent reports of follow-ups in juvenile diabetics treated by rigid control method, as noted in a recent editorial in the Journal of the American Medical Association.[12] One beneficial result which the precepts of the "free dieter" school of diabetic management has been the diversion of some physicians from the practice of treating the patient's urine and blood sugar tests to the wiser policy of treating the patient himself.

It is now apparent that the criteria for control depends to a large extent on the type of patient with diabetes with whom one has to deal. An attempt will be made to divide diabetic patients into certain well defined groups and discuss briefly the type of management which, from the evidence at hand, seems appropriate. In the long run, however, each case must be individualized and controlled according to the special features which it presents.

THE OBESE DIABETIC PATIENT

This type of patient constitutes almost fifty per cent of diabetic patients. They are

usually of middle-age and their diabetes seems to be related to their body mass. Here strict control, often by diet alone, with a weight reduction diet and the achieving of normal body weight often wipes out all evidence of diabetes. Certainly this type of patient should be required to adhere to strict control of hyperglycemia and glycosuria since the reward is an almost normal state of "potential diabetes" rather than the clinical syndrome. One cannot expect, however, to reverse degenerative changes which have taken place during the gradual onset of the disease before symptoms became severe enough to bring the patient to the doctor's office. A fat diabetic patient should be considered a treatment failure.

THE JUVENILE DIABETIC PATIENT

There is evidence from the laboratory that if one can start treatment early enough in diabetes, cure is possible. The characteristic abrupt onset with severe symptoms which most juvenile diabetics exhibit serves to sharply mark the beginning of their disease. It is in this type of case that not only the findings of experimental diabetes research, but also clinical studies indicate strict control of the diabetic state from the onset. At the State University of Iowa, Jackson[13] and his colleagues have been using a method of rigid control of diabetes in children which has evidently paid off after ten years with a greatly lessened incidence of degenerative disease.

Basing their treatment on the premise that "the diabetic child has normal propensities for health as long as his diabetes is well controlled and that therapy should be based on the maintenance of normal physiologic conditions as far as possible," these workers have demonstrated that those patients who maintained this level of control for ten or more years showed no degenerative changes, while those whose control was not good showed as high as 47 per cent retinopathy, lens changes in 15 per cent, and early arteriosclerosis in 16 per cent. This is apparently the first clinical demonstration that degenerative changes are perhaps not only related to the duration of the disease but also to the degree of control. Their regimen of treatment entails careful education of the patient and parents, the prescribing of a nutritionally adequate diet, and the administration of either 4 doses of regular insulin or 2 doses of regular insulin and 1 dose of globin insulin. The hopeful outlook which these workers have cast upon the juvenile diabetic patient certainly makes this rigid routine worthwhile.

THE DIABETIC PATIENT WITH COMPLICATIONS

After arteriosclerosis, retinopathy or degenerative renal disease have made their appearance, there is little reason to believe that rigid control of blood sugar levels with the concommitant risk of insulin reactions is worthwhile. Many of these patients show a "high renal threshold" for sugar and maintain aglycosuric urinalysis in spite of hyperglycemia. It is a common experience to find that these patients "feel better" with blood sugar values above normal and there is a suggestion from the literature that perhaps the hyperglycemia is a part of the patient's resistance mechanism. In these cases the criteria for control are primarily clinical, and consist of the maintenance of a sense of well being, freedom from symptoms, and the avoidance of insulin reactions.

THE BRITTLE DIABETIC PATIENT

About 10 per cent of diabetic patients who require insulin are extremely difficult to control and will show marked variation in blood sugar and glycosuria while following a constant diet and taking constant insulin dosage. These patients are usually in the younger age groups, have severe diabetes, tend to be thin when their disease first makes its appearance and are, as a rule, tense emotionally. These patients can be controlled only with multiple injections of regular insulin or by 2 doses of intermediate acting insulin. They are prone to reactions from insulin and at times apparently have reactions at blood sugar levels that are not severely hypoglycemic. In evaluating these cases, the views of Fabrykant[14] should be taken into consideration. He found that many so-called labile, or as Wodyatt called them "brittle" diabetic patients exhibited electrocerebral dysfunction, and in some low blood calcium values were demonstrated. Insulin reactions ceased on anti-convulsant and calcium therapy. Such drugs as phenobarbital, dilantin sodium and other anticonvulsants may therefore be considered as adjuncts in insulin and diet therapy. Again, attention to the psychological aspects of the patient's case may be important.

OTHER MEASURES OF THERAPY IN DIABETES MELLITUS

With increasing knowledge concerning the mechanisms of carbohydrate as well as protein and fat metabolism, efforts are being made with much zeal to determine other therapeutic approaches to the problem of

diabetes.[15,18] In experimental diabetes induced by alloxan, the injection of glutathione immediately after alloxan is given will prevent the development of diabetes. Similarly, according to a report by Conn, Louis, and Johnston,[16] the diabetes induced by the injection of adrenocorticotrophic hormone can be alleviated by the use of reduced glutathione. Houssay,[17] reviewing the effect of sulphur compounds on carbohydrate metabolism notes their protective effect in cases of diabetes following pancreatectomy in experimental animals.

Vitamin E, a substance which has been suggested for the treatment of many ills, has also been suggested in the treatment of diabetes mellitus. A group at the Mount Sinai Hospital,[19] in a clinical evaluation of this substance found no improvement in a series of 27 patients.

Much progress is being made in the knowledge of the site of insulin's action in the body.[10a] Until Cori demonstrated the participation of insulin in the hexokinase reaction by which glucose is converted to glucose 6-phosphate, there was no knowledge of just what part insulin played in the complex reactions involved in the metabolism of carbohydrate. It has now been found that insulin is also involved in various reactions in the tricarboxylic acid cycle. Still no practical application of these advances has been made to the clinical management of diabetes.

SUMMARY

1. A review of the general management of diabetes mellitus has been made, emphasizing the principles of diet, insulin, exercise, and education.

2. The tendency to a hopeless attitude with regard to inevitability of degenerative changes in cases of long-standing diabetes cannot be held entirely justifiable, since these changes are delayed and prevented by determined application of the above principles.

3. An attempt has been made to individualize the criteria for diabetic control, rather than to set a general goal for all types of diabetic patients.

4. While there is much information from the laboratory that the therapeutic approach to diabetes mellitus may undergo radical changes in the future, no such changes are available for the treatment of clinical diabetes today. It therefore behooves physicians treating diabetes to take advantage of all the methods of treatment available, offering his patient an almost normal life span.

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False Prosperity

(Continued From Page 301)

such as office rent, salaries to office assistants, etc. In an inflationary period this expense item continues to rise. Americans are beginning to realize that government cannot buy prosperity at the expense of the tax-payer. The present inflation is evidence of a false prosperity brought on by foolish Federal spending. Don't think you are better off because you have more phony currency passing through your hands.

Womack, January Named

Dr. C. L. Womack, Carlsbad, and Dr. J. L. January, Albuquerque, have been appointed as members of the Board of Trustees of New Mexico Physicians' Service.

Adler Appointed

Dr. Stuart W. Adler, Albuquerque, has been appointed to the New Mexico State Hospital Board by Governor Edwin L. Mechem.

VARIABILITY OF INSULIN RESPONSE

By Theodore M. Feinblatt, M. D., and Edgar A. Ferguson, Jr., Chemist,
Brooklyn, New York

The variations in every measurable human trait are distributed evenly on a bell-shaped curve when placed on a graph. This is true whether a simple measurement is made, such as the height of man, or whether some complicated function is measured. In the present study the amount of fall in blood sugar for each unit of insulin per kilogram is measured. As pointed out by Darwin, any animal trait that is variable is so distributed. Darwin showed that a count of the number of rays on mollusks described an exact bell-shaped curve. See Fig. 1.

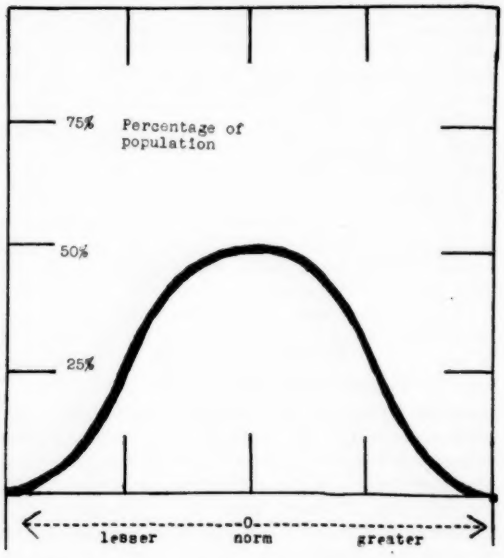

FIGURE 1. This illustrates the normal distribution curve. 50% fall into the central group and 25% are distributed equally in the higher and lower groups.

Later Thorndike showed that the same distribution was found in more complicated measurements (as scholastic aptitude and other specific mental achievements). In addition it was demonstrated that the male usually showed greater variability and thus produced a flatter curve than the female for almost any trait measured.[1]

This trait persists throughout the animal world. Darwin states "I have given sufficient evidence in my 'Descent of Man' that male animals are usually more variable than the females"[2]. See Fig. 2.

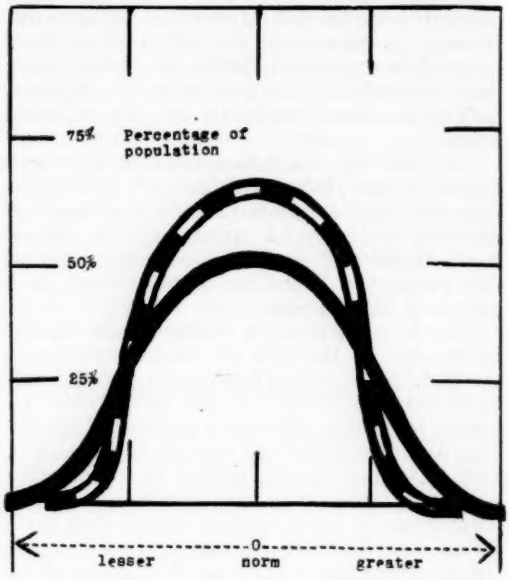

FIGURE 2. The continuous line encloses the surface of frequency for men, and the dotted line for women. This shows that the men differ among themselves by wider extremes.

Feinblatt and Ferguson[3] have reported that the amount of insulin required to utilize the readily available carbohydrate of the diet varied in accordance with a normal distribution curve. But there are two marked variations from the bell-shape. The first variation constitutes a sharp cut off on the left hand (poor response to insulin) side. This is because it is probably impossible for an individual to exist whose response to insulin is poorer than 0.4 grams of carbohydrate per unit of insulin. It is presumed that these individuals die due to poor response to insulin. Cases of insulin-fast diabetics have been reported[4].

Secondly, the curve shows a secondary loop on the right hand side (good response to insulin). This is a group of so-called "diabetics" which respond to insulin far better than average. The shape of the curve reconstructed for convenience in this report is illustrated in Fig. 3.

Note the cut off point on the poor response side. There are naturally many mild diabetics which group would crowd into a

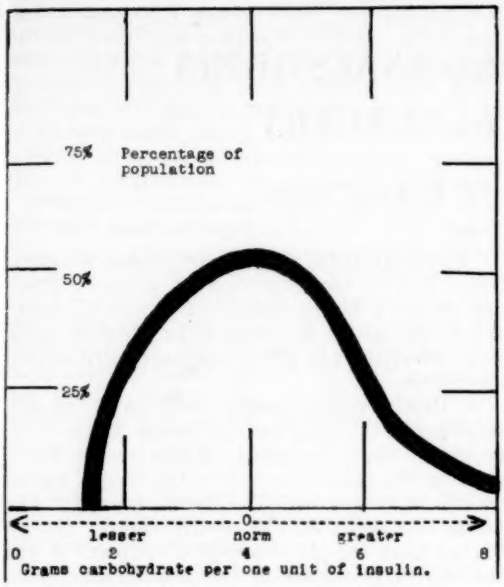

FIGURE 3. Degree of insulin sensitivity shows normal distribution among 200 diabetics. Sharp cut-off on left shows few survivors below one gram per unit (insulin-resistant).

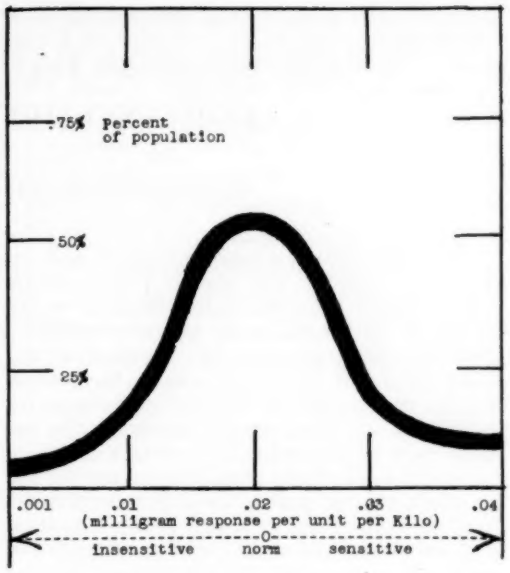

FIGURE 4. Most normal individuals have a .02 milligram response for each unit of insulin per Kilo. Others are evenly distributed along the normal bell-shaped curve.

secondary loop on the good response side (not illustrated). The rest of the curve follows the normal bell-shaped distribution curve.

The response of rabbits which have been used for insulin assay reported by E. A. Ferguson[5] shows a perfect normal distribution curve. Twenty per cent of the rabbits are extremely unresponsive and twenty per cent are very insulin sensitive. The remainder fall into the large central group which is useful in determining the effect of insulin on blood sugar.

The present series on physically normal human beings shows the response to insulin given for the purpose of producing shock in cases of mental unrest.

All readings have been translated into the milligrams blood sugar response per unit of insulin per kilogram of weight. This forms a convenient basis for comparison with animal studies and with diabetic studies.

A condensed protocol of the series is as follows:

PER CENT OF DETERMINATIONS	MILLIGRAM RESPONSE (per unit per kilo.)	
14%	.04	(insulin sensitive)
18%	.03	
55%	.02	
14%	.01	
4%	.001	(insulin resistant)

The results in the form of a graph show the normal distribution curve as illustrated in Fig. 4.

CONCLUSIONS

There is a strong central tendency in the normal distribution curve of response to insulin. This means that results of insulin dose can be predicted with a fair degree of reliability. For the standard human of 70 kilograms (150 lbs.) each unit of soluble insulin produces a response of minus 1.4 milligrams (.02 x 70). Forty units would therefore produce shock levels.

The statistical analysis is in accord with clinical experience.

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OIL SOLUBLE CAUDAL ANAESTHESIA FOR ANO-RECTAL SURGERY

By Harold Eidinoff, M. D., El Paso, Texas

The alleviation of post-operative pain in ano-rectal surgery has always been a difficult problem. The operative field is richly supplied by nerves and is surrounded by powerful sphincter muscles. As soon as the effects of the ordinary anaesthetic have worn off, the contraction of the sphincter muscles on the traumatized tissues produces the intense pain which patients complain of.

In 1934, R. V. Gorsch[1] reported on the use of oil soluble anaesthesia, preoperatively, injected around the anal canal. This method produces a prolonged period of post-operative analgesia and muscular relaxation. It has been widely used for the prevention of post-operative pain.

Recently, Barnett A. Greene,[2] has improved on this method by using Intracaine in oil five per cent,[3] in the caudal space for both operative anaesthesia and post-operative analgesia.

CAUDAL SPACE

Caudal anaesthesia makes use of the caudal space. This space is extra-dural. It lies in the sacral canal and extends from the second sacral vertebrae to the coccyx. Because of a normal failure of fusion of the arch of the fifth sacral vertebrae, the caudal space can be entered with a needle by piercing the superficial posterior sacrococcygeal ligament. The caudal space contains loose areolar tissue, fat, lymphatics, blood vessels, the third, fourth and fifth sacral nerves and their ganglia and the coccygeal nerves and their ganglia. The nerves are covered by dura as far as the dorsal root ganglia. No anaesthetic agent can penetrate the dura. However, in the caudal space, the nerves will be affected by an anaesthetic agent at the ganglia or peripheral to them.

The first effect of the anaesthesia is hypalgesia, then analgesia, hypesthesia and finally muscle relaxation. There is a partial but not complete loss of temperature and proprioceptive sensation. The sacral parasympathetic nerves are blocked, resulting in a loss of sensation and motor control of the bladder and rectum.

The technique which we have used is similar to that described by Barnett A. Greene[2].

Premedication with barbiturates is essential. 1½ to three grains of a barbiturate are given 2 hours before the time of operation. Morphine or Demerol in suitable doses with Atropine are given one half hour before operation.

A Pitkin spinal needle with its stylet are introduced into the caudal space. Care must be taken that the point of the needle stays close to the posterior wall of the caudal space which is avascular. To avoid piercing the dura, the point of the needle should not go higher than the third sacral vertebrae. After the stylet is removed, the needle should be aspirated. If blood or spinal fluid can be aspirated, the needle should be entirely withdrawn and some other method of anaesthesia used. This will obviate entirely the danger of injecting the anaesthetic into the blood stream or into the subdural space.

If no blood or spinal fluid can be aspirated five cc. of aqueous procaine two per cent, is injected. This will aid in determining that the needle is in the caudal space. If it is suspected that the needle is subcutaneous, the injection of five cc. of air will provide a clue.

The next step is the injection of the oil soluble anaesthetic. We are using 25 to 30 cc. of Intracaine in oil five per cent,[3]. This is first mixed thoroughly with one cc. of Adrenalin in oil and warmed to body temperature. This mixture is then injected slowly into the caudal space over a period of 15 minutes. After the injection is completed, another five cc. of aqueous two per cent procaine is injected as the needle is withdrawn. The anaesthesia develops slowly. If the surgeon is pressed for time, he can begin the surgery after the injection of two per cent aqueous procaine subcutaneously around the anus.

GRATIFYING RESULTS

The results of our experience with this method have been very gratifying to us and to our patients. We have used this anaesthesia in 16 cases of anorectal surgery. The surgical anaesthesia and the relaxation of the anal sphincters were complete in all cases. Anaesthesia lasted 4 to 8 hours. This was followed by a period of analgesia which lasted

an average of 7 days. Only one patient required morphine post-operatively. Five patients required an average of 3 injections of Demerol. The rest were comfortable with small doses of aspirin orally.

In two cases, there was a moderate drop in blood pressure which returned to normal without medication. In one case there was a moderate amount of vomiting which disappeared spontaneously. In one case, there was a mild convulsive reaction. Sodium Pentothal intravenously stopped the convulsion. A convulsive reaction may occur in any patient who is hypersensitive to procaine or its derivatives. The injection of barbiturate intravenously is the antidote for this reaction and should always be available whenever procaine or any of its derivaties are used.

105 CASES

Barnett A. Greene reports a series of 105 cases of Intracaine in oil caudal anaesthesia with similar good results.

Oil soluble caudal anaesthesia for anorectal surgery has the following advantages over other methods:

1. It produces excellent surgical anaesthesia and muscular relaxation on a par with spinal anaesthesia.
2. It produces a prolonged period of analgesia post-operatively, obviating the necessity for narcotics in most cases and making possible early ambulation and early discharge from the hospital.
3. Oil soluble caudal anaesthesia lacks the disadvantages of spinal anaesthesia, namely, the post spinal headache, and the occasional tendency to produce severe hypotension and shock.
4. This method is suitable in old and debilitated patients.
5. Oil soluble caudal anaesthesia makes it possible to operate on the anus and rectum in the prone position.
6. In nervous patients, the anaesthesia can be supplemented with intravenous barbiturates given in small doses to keep the patient asleep.

The contraindications for oil soluble caudal anaesthesia are infections around the sacrum, and a fusion of the fifth sacral arch which prevents the needle from entering the caudal space. In some individuals there is a greater than normal covering of the sacral nerves and ganglia by the dura. In these cases the onset of anaesthesia will be prolonged. Local anaesthesia can be used as a supplement.

Oil soluble caudal anaesthesia is an excellent anaesthesia for anorectal surgery, providing the proper technique is followed. The contraindications and possible complications should be kept in mind. It is a safe anaesthetic and provides better post-operative analgesia than any method used previously.

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Public Relations . . .

(Continued From Page 300)

Here are some ideas for county societies:

1. Active participation in civil defense.
2. Development of a doctor's emergency telephone service.
3. Closer working relationship with the Women's Auxiliary, and encourage organization of additional chapters.
4. Consider county society meetings as joint dinner affairs, with wives present and with a non-scientific speaker; opportunity here to have lay speakers on current subjects of interest.
5. Cooperation in the development of local health councils.
6. Adoption of average community fee schedules.
7. Where feasible, organization of a local speaker's bureau.
8. In larger communities, maintain a list of medical spokesmen for press and radio.
9. Support of all sound voluntary health insurance programs.
10. Seek out and aid local authorities in correcting health hazards. Every county society should put the finger on the major local health hazard, document it, and present the problem to local officials and the local newspaper.
11. Cooperate with school officials in encouraging health discussions in the class rooms; provide AMA motion pictures, etc.
12. In a few "pilot" communities, arrange for broadcast this fall of "Dr. Tim, Detective," or an AMA radio series, for school youngsters; with intensive promotion by medical society and auxiliary.
13. Encourage physicians to enter politics.
14. Intensify efforts to locate physicians in communities where needed.
15. Take an active part in advancing the cause of rural health.

Dr. John C. Murphy

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